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The Mundrabilla Meteorite: a New Discovery in Western Australia

In March 1966, while engaged on a geological survey of a portion of the Eucla Basin in Western Australia, we discovered two large iron meteorites. The two principal masses, lying some 600 ft. apart, are located on the Nullarbor Plain, to the north of the Transcontinental Railway (latitude 30° 47′ S., longitude 127° 33′ E.). Earlier reports of the sighting of a meteorite by a rabbit-trapper, now deceased, have led to several expeditions which failed, however, to discover these masses.

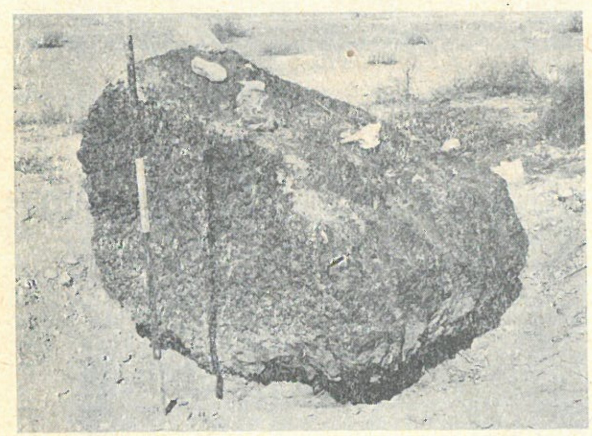

Fig. 1. Large mass of the Mundrabilla Meteorite, showing "basal" surface and "parting" surface.

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Field estimates indicate approximate weights of the masses to be 10 to 12 tons and 4 to 6 tons respectively. Both weights are considerably in excess of any previously recorded Australian discoveries.

The masses lie within slight depressions in clayey soil which overlies Nullarbor Limestone of Miocene age. Excavation has revealed the presence of an underlying irregular crust of finely laminated iron "shale", which rests directly on silicified Nullarbor Limestone. Similar fragmentary iron shale also occurs in an incomplete stellate pattern, distributed for many hundreds of feet, largely eastwards of both masses.

The larger mass tends to have a crude conical to hemispherical shape with the nose partially buried in the soil.

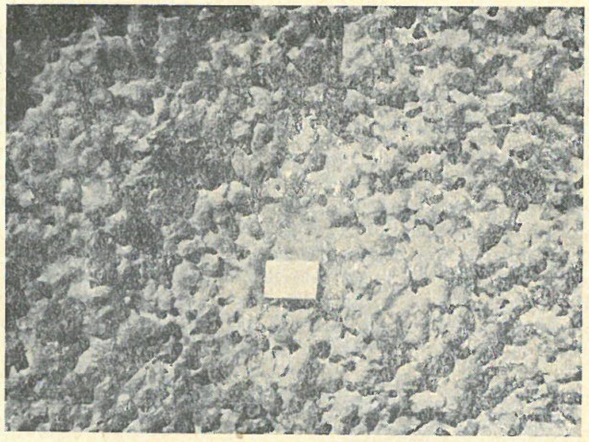

Fig. 2. Large mass—close-up view of "parting" face showing knobbly surface. A matchbox gives the scale.

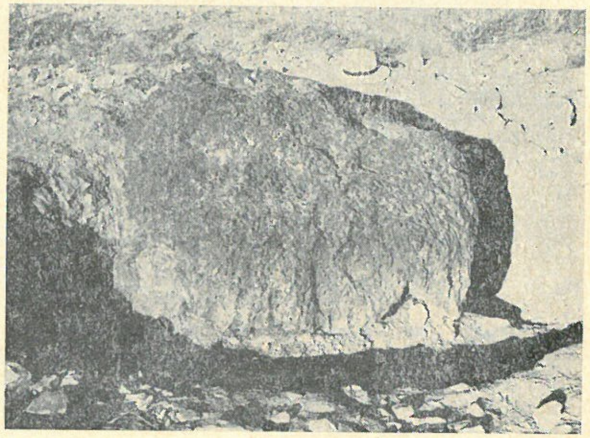

Fig. 3. Smaller mass of the Mundrabilla Meteorite, showing ablation "furrows" with the "parting" surface to the left of the picture.

In the present position of rest the axis is inclined at an angle of approximately 60° (Fig. 1).

Evidence of fragmentation of a larger mass is afforded by a sharp, angular, vertical face on the larger mass, which matches both in size and shape a similar sharp face on the smaller mass. Another parallel incipient racture is apparent on the "basal surface" of the larger mass (Fig. 1).

The surfaces of each mass present an extremely "knobbly" appearance (Fig. 2), presumably where troilite grains have been selectively abladed during passage through the atmosphere. Atmospheric weathering has undoubtedly modified these features although ablation furrows and striations are still well preserved and provide remarkably clear evidence of stable orientation in passage through the Earth's atmosphere (Fig. 3). Concentrations of small iron fragments around the bases of each mass are presumed to have weathered from the larger masses since the fall.

The material of several of these smaller fragments has been shown by polishing and etching to belong to the medium-octahedrite subdivision of the iron meteorites. Large troilite grains together with irregular masses of graphite and (?) schreibersite are also present.

By means of a detailed grid of an area of several acres around the larger masses the distribution pattern of small iron and iron-shale fragments has been established. Preliminary investigation of the results indicates that the meteorite came from the west at a relatively low velocity and high angle. No evidence of cratering or bouncing was found and it appears that the meteorite parted from its smaller fragment before impact with the Earth's surface. The process of burning apart along one of two parallel fractures by the torch-like effect of concentrated air-channelling has abladed a great number of smaller fragments, which are distributed along a west to east band for at least 1 mile.

The area of the fall has an extremely arid climate, only a very thin soil cover and is one of very flat terrain with little or no drainage features. Consequently, the present find represents an extremely well preserved record of the fall of a large iron, from which much valuable information in many aspects of meteoritics may be gained.

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